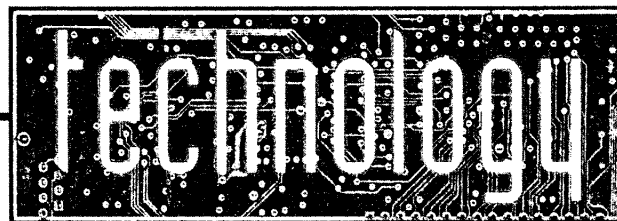


Empowering Students with



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Crafting a Vision for Empowering Students

For the past thirty years, the promise of increasing processing power, quantum leaps in storage, nearly unlimited bandwidth, and the shrinking of computers into handheld devices, has caused many educators to dream about the potential of harnessing this power to improve learning. Technology is finally faster, cheaper, easier, and smaller. How long will it take to convert this amazing change in technology into improved learning? Will we have ten times the learning with ten times the processing speed? What is the formula for converting megahertz, RAM, and megabits into learning results? What can we realistically expect the impact of technology on learning to be?

Currently, the nation is on a spending bonanza. Market Data Retrieval, a Connecticut-based educational research company, recently found that public schools in the United States spent an estimated \$5.67 billion, or \$121.37 per student, on technology in the 1999–2000 school year. That figure is a 2.5 percent increase over spending for the previous year (Weiner 2000). The e-rate (a nationwide program that discounts the cost of Internet access for schools and libraries) is providing funding to link our nation's classrooms to the Internet. What kind of improvement in learning can we really expect from these unprecedented expenditures?

A few years ago, the *Wall Street Journal* published a special insert on the impact of technology on education. The graphic on the front page depicted a student reaching as high as he could to use chalk on a blackboard. He was standing on a computer to reach higher—not a very flattering image. The image strongly suggests that we are using technology as a stepladder to continue to teach the same way we have been for a long time. ✎

Technology proponents (techno-enamored nerds like me) argue the widespread applications of technology can reform schools, level the play-



ing field for disadvantaged students, provide disabled students with real opportunities for participating in the mainstream, and create new opportunities for educators to build communities of best practices. The list of potential positives is extensive and even transformational—anytime/anywhere learning for all at a reasonable cost. Some of us even imagine bridging the digital divide while it continues to grow deeper every day.

To date, there is very little test data to suggest that

the promise of improved learning for all has been met. What has gone wrong? Is the technology too difficult to use? Is staff development missing? Is education boxed in by government regulations that limit the creative use of powerful machines? Is the structure of schools, prescribed by the Industrial Age, too rigid, too hierarchical? Are we missing the critical mass of investment? Or does it just take a long time to ramp things up? Perhaps the critics have been right all along, and there is much less real promise than many of us want to believe.

One seminal thinker, Shoshana Zuboff, a professor at the Harvard Business School, offers a possible explanation about why technology has not transformed education. Years ago, when researching the impact of technology on business, she discovered that an organization could spend a great deal of money, train everyone, and correctly install the network without achieving any significant improvements. She notes that General Motors spent more money than any other private organization in the world on technology during the 1980s. The end result was a lowering in the quality of cars (Zuboff 1988). Why didn't technology make a difference?

Through her research, Zuboff observed that there were two very different approaches to the use of technology—automating and informing. Automating led to incremental improvements, while informing led to transformational improvements.

Automating

Automating is the more obvious and common approach to applying technology. Automating essentially means “bolting” technology on top of current processes and procedures. When an organization automates, the work remains the same, the locus of control remains the same, the time and place remain the same, and the relationships remain the same. The same processes solve the same problems. Automating can lead to incremental improvement, but in some cases, as with General Motors, the quality of work actually declines.

In schools, we have automated the report card, the card catalog, the pencil, various science lab instruments, and many other traditional assignments. Many schools have entire programs to automate the blackboard with PowerPoint presentations across the curriculum. We now use computers to print report cards faster, to look up library books faster, to edit the five-paragraph essay faster, and to collect data faster. Each can be an underutilization of the power of the technology. We do it because the work is familiar.

As Zuboff (1988) discovered time and again, faster does not necessarily mean better. For example, a high school librarian once asked me to review term papers students had written before and after the card catalog was automated. She was concerned that the new and expensive automated system was lowering the rigor of student work. As I scanned student papers, I could not tell the difference, but she could. She pointed out a pattern in the authors referenced in each bibliography. Students who used the automated catalog had primarily selected books appearing in the top half of the alphabet. Students who had used the traditional card catalog had chosen books that spanned the entire alphabet. The ease of accessing the information via the online catalog had lowered the quality of student research. The librarian was no longer naively touting the power of the automated card catalog. This serves as a reminder to beware of unintended consequences when technology is introduced; they almost always exist.

Informating

Zuboff (1988) observed that informing is a more powerful way of thinking about technology than automating. While informing can lead to a much higher quality improvement, it is much more difficult to implement. It is not that the technology is more difficult to learn; in fact, very often an informed application uses the same technology as an automated one.

What makes informing more powerful is a shift of control and empowerment. The organization fundamentally changes the flow and control of information. With informing, people who previously did not have access to information and the responsibility to apply the information to solve problems find themselves more empowered. New technologies can leverage empowerment through access to new sources of information and relationships.


In an informed environment, more people have timely access to information. For example, parents and students have access to grades every day instead of once a quarter. Students have access to content information that was previously only available in the teacher's edition of the textbook or in a university. Teachers have access to knowledge about brain research and new technologies that was only available in staff development workshops. With timely access to information comes the potential for a shift in responsibility. As many traditional companies and universities have already discovered the hard way, when the customer or the worker gains access to new sources of information, chaos and even disaster can rule. But the upside gain can result in a transformation of quality and new services.

It is unlikely that technology will improve learning without a powerful vision and without thoughtful and creative teachers challenging students to go beyond traditional expectations of achievement. Educators can certainly bolt technology on top of the current curriculum and students can use the computer as a \$2,000 pencil with which to write a five-paragraph essay for a grade. Or, educators can challenge students to serve as coauthors with students in other countries to publish their work for a global audience.

As you read the stories in *Empowering Students with Technology*, you will see the beginning of a cultural shift toward collaboration and learning empowerment. Teachers are exploring new ways of collaborating with each other, the family, and the community to provide a much more supportive and challenging environment for students through a wider range of information access and relationships.

Moving Toward Informating Learning

Perspective and leadership—not technology—is what distinguishes automating from informating. When automating, the goal is to preserve the current structure. The essential question is, what technology can we buy and install to improve what we are currently doing? Informating revolves around a perspective of asking what new and timely information we can give people in the organization and what new relationships we can nurture to improve the quality. There is a fundamental shift of control with informating. Relationships change, schedules change, the use of space changes, and, most importantly, responsibility shifts to the person who is the closest to solving the problem. The same technology can be required for both informating and automating. What makes the difference is the flow and control of information and the change in the relationships. Automating reinforces the current relationship of control. Informating leads to empowerment.

In an automating model, the technology is the vision. In an informed model, technology is just the digital plumbing. It enables a fundamental change in the culture of learning where students assume much more responsibility for managing their own learning, and collegial and community relationships expand. 

When automating, the main focus of planning is “Technology Planning.” The essential questions are technocentric:

- What technology should we buy?
- Where should we put the technology?
- How do we train the teachers to use it?

Rather than allowing automating questions to guide planning, it is more important to examine what we should be flowing through the technology and the potential new relationships. When informating, the technology infrastructure is still essential but it does not become the driving issue. Informating questions may include:

- What information do you need to improve your work?
- What new relationships can improve learning?
- What authentic relationships can you imagine for your students and educators?
- What technology do you want?

It is only natural for an organization to automate first. Automating preserves the organization's processes and structure. No one has to lose control of information, and new relationships are not required. Essentially everything stays the same.

Informing requires thinking about opportunities that could not be achieved without the technology. Informing creates chaos and potential confusion of roles. It can be very messy from a management and leadership perspective. Some would argue that there is no compelling reason at this time for schools to informate. However, as online delivery of educational services and competition to the local school increases, there will be a very compelling reason to informate: competition.

Many creative, risk-taking educators are exploring informing opportunities right now. These teachers are linking students and, in some cases, their families, to new sources of information and new learning relationships. One of the most powerful lessons I have learned about student motivation is that if students are given an authentic audience they work harder as a group than they work for their teacher alone. Creating authentic audiences for students is one of the emerging skills for teachers. Many teachers also agree that students generally work harder for an authentic audience than for a grade. Music and drama teachers explain that it is the audience in the auditorium that is the primary motivator of student practice. What if every teacher had a global auditorium to motivate students to do their best work? While the technology makes writing easier (automated) it can also provide access to new relationships for authentic assessment (informed). Ultimately, classrooms will become global communication centers and students will be connected to an increasing set of authentic relationships.

We should only expect to see incremental improvement when we bolt technology onto individual classrooms (automate) and keep the same assignments within the structure of the same teacher/student relationship we have had for the past eighty years. In other words, we can send students down to the computer lab to type a five-paragraph essay. The technology certainly makes it easier to edit and spell check and add beau-

tiful graphics to the text. By itself, this is automating and we would not expect to see a transformational improvement in student writing. The unique opportunity the technology provides is that we can now publish that student's work for the world to see, or we can connect that student directly to an authentic audience for review, such as with a retired veteran for an assignment on World War II.

It is possible to visit teachers who are teaching their students that there are very few limits to accessing information and people. The students in these classrooms understand technical skills, but they also understand something much more important. They are the first generation to be global publishers—to access the raw material of information and to create refined knowledge products for application. They understand the social skills of working with people who they will never meet face to face. They also understand that they need to take more responsibility for managing their own learning. They do not see the boundaries of school as a solid wall. They see school as a global communications center. Or, as one New York City teacher explains, "My classroom is a place where you come and do work." It is incredibly exciting to watch students learn the skills they need while at the same time understanding that the work they are producing can potentially make a difference to other human beings.

In this stage of the transition from the isolated to the connected classroom, we need leaders who can help their colleagues understand how to move to a team-based environment. Teaching teachers to use technology is relatively simple (automating); helping teachers to share student work and to build relationships (informating) is a more complex opportunity (see Figure Intro.1). It is the difference between maintaining the relatively isolated classroom as its own entity and building a networked learning environment for students and a more professional culture for teachers. What this means is that the role of the superintendent and the principal to understand how to manage change becomes absolutely essential. Leaders do not need extensive technical skills. However, they do need to understand how to support risk-taking teachers and to craft a vision where technology is clearly viewed as simply the digital plumbing.

